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Death Narratives and Cervical Cancer: Impact of Character Death on Narrative Processing and HPV Vaccination

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Objectives: Narratives hold promise as an effective public health message strategy for health behavior change, yet research on *what types* of narratives are most persuasive is still in the formative stage. Narrative persuasion research has identified 2 promising features of such messages that could influence behavior: whether characters live or die, and whether characters encounter key barriers. This study investigated the effects of these 2 narrative message features on young women's HPV vaccination intentions and examined mediating psychological processes of narrative persuasion in the context of cervical cancer messages. **Method:** We manipulated these 2 features in a narrative HPV vaccine intervention targeted to a national sample of U.S. women 18–26 who had not initiated the vaccine ($N = 247$). Participants were randomized in a 2×2 between-subjects experiment. **Results:** Compared to death narratives, survival narratives increased narrative believability and self-efficacy while lowering perceived barriers to vaccination. As features interacted, survival narratives featuring social barriers led to greater narrative transportation (absorption into the story) than other combinations. Moderated mediation analysis tested 10 theoretically derived mediators; transportation and risk severity mediated the narrative–intention relationship. **Conclusions:** Findings provide evidence for key psychological postulates of narrative persuasion theory. Results inform practical application for the construction of effective narrative message content in cervical cancer prevention campaigns for young women.

Keywords: persuasive communication, narratives, HPV vaccine, transportation imagery theory, cervical cancer

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Historically, communicators have emphasized direct and rational arguments when constructing messages to enhance public health (Bilandzic & Busselle, 2013). Recently, researchers have turned attention to narratives (stories) as alternate means of persuading individuals who are difficult to reach or resistant to didactic messages (e.g., Jensen, King, Caricioppolo, Krakow, & Morgan, 2014; Slater, Buller, Waters, Archibeque, & LeBlanc, 2003). Some narratives seem to resonate more than others and as a result are more persuasive. Accordingly, researchers are increasingly interested in how to use narrative persuasion for public good,

for instance, increasing adherence to recommended cancer prevention actions (Kreuter et al., 2007).

Storytelling is a common part of human communication (Abbott, 2002), particularly in the context of health (Sharf, Harter, Yamasaki, & Haidet, 2011). Despite the ubiquity of such storytelling, limited research has tested narrative features that could influence health behaviors. Narrative persuasion research is interested in identifying influential message features and explicating underlying mechanisms of effect (e.g., Chung & Slater, 2013; Dillard, Fagerlin, Dal Cin, Zikmund-Fisher, & Ubel, 2010; Kreuter et al., 2007).

To date, at least two narrative features have yielded promising results in cancer control: whether characters live or die (story outcome) and the types of barriers characters face to healthy behavior. The present study examined the persuasive impact of both outcome- and barrier-focused narratives. No study to date has examined both features—a design that allows researchers to test for interaction effects (Slater & Gleason, 2012). Additionally, the study evaluates 10 theoretically derived psychological mediators through which narrative messages may influence behavior, making this a robust test of narrative mechanism. The current study examines whether these features and mediating processes influence young women's

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This article is presented in memory of Dr. Robert N. Yale.

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intentions to engage in human papillomavirus (HPV) vaccination for cervical cancer prevention.

Narratives for Cervical Cancer Prevention

Current HPV vaccination rates remain far below public health targets for girls and young women (Centers for Disease Control and Prevention, 2013). To more effectively promote cervical cancer prevention, researchers have evaluated the types of messages likely to increase vaccination. Among these efforts, narrative campaigns have yielded promising results (Hopfer, 2012). Narrative persuasion research can not only identify types of stories likely to work, but also mechanisms through which they impact audiences.

In the context of cancer control, a key narrative feature may be whether the main character lives or dies. Schaffer and colleagues hypothesize that the physical or psychological health outcome presented in a narrative is a key component of persuasive narratives (Shaffer & Zikmund-Fisher, 2013). Past research has primarily examined the effects of survivor or survival narratives (e.g., Kreuter et al., 2008; McQueen & Kreuter, 2010; McQueen, Kreuter, Kalesan, & Alcaraz, 2011; Thompson & Kreuter, 2013), but little work has explored the impact of character death. Examining this notion, a recent experiment found that narratives foreshadowing the death of a main character to melanoma increased intentions to engage in monthly skin self-exams compared with narratives in which the character survived the diagnosis (Jensen, Yale, Krakow, John, & King, 2017). Death narratives may affect psychological processing of a message, for instance, increasing a reader's transportation into the story (i.e., the feeling of being deeply absorbed or "lost" in a good story; Green & Brock, 2000) or enhancing the believability of a story (Yale, 2013). Kreuter and colleagues (2007) posit that such aspects of the plot may be one key to a story's potential to have an impact on real world health behaviors.

Barriers to HPV vaccination are a significant concern and thus feature prominently in messaging to promote this behavior (Holman et al., 2014; Rambout, Tashkandi, Hopkins, & Tricco, 2014). Barriers may be broadly grouped into two categories—structural and social concerns. Structural barriers are individually oriented and include logistical obstacles to obtaining the vaccine, such as inconvenience of scheduling multiple appointments and deterrents, such as discomfort associated with needles (Holman et al., 2014). Social barriers revolve around social perceptions of health behavior, such as perceived promiscuity associated with the vaccine (Krakow et al., 2015). Engaging health stories often feature characters facing a barrier to healthy behavior and can serve as opportunities for behavior change. For example, Dillard et al. (2010) found that stories about similar others overcoming key barriers increased intentions for adults to screen for colorectal cancer. Building on this finding, the present study investigates whether including different categories of barriers (e.g., social vs. structural barriers) would be more effective at increasing intentions toward HPV vaccination.

Perhaps the least studied and potentially most compelling aspects of persuasive storytelling are the underlying processes triggered by health narratives. Narrative persuasion appears to operate through mechanisms unique to story-driven messages and distinct from didactic communication processes. Thus, researchers have begun to develop models that specifically address the psychological mechanisms driving engagement with narrative information (e.g., Green & Brock, 2000; Nabi, Moyer-Guse, & Byrne, 2007;

Yale, 2013), in addition to traditional health behavior models. Much of this work has focused on the role of narrative involvement, which suggests that the degree to which a person becomes involved or engaged in a narrative will influence the degree to which a narrative is persuasive.

One of the more prominent frameworks in this area is transportation imagery theory (Green & Brock, 2002; Green, 2006), which explores how audiences become transported or "carried away" into a story. *Transportation* may operate by fostering connections with characters, reducing the ability to produce counterarguments, and making stories seem like real experiences for message recipients. In this model, transportation is hypothesized as the principal mechanism mediating the relationship between narrative messages and behavioral outcomes.

Additionally, the story model posits that the believability of narratives plays an essential role in an audience's engagement and comprehension of story-based information (Pennington & Hastie, 1992). Narrative believability consists of four mechanisms that influence whether a given story will motivate a listener to action (Yale, 2013). *Story coverage* is the degree to which a story accounts for all of the information presented in the story. *Consistency* is lack of internal contradictions within a story or with other things the listener believes. *Plausibility* refers to an audience's judgment of the similarity of the story with other true or believable stories. Finally, *completeness* evaluates whether a story conforms to expectations about the way stories should be structured and organized.

The study of narrative persuasion processing can also be supported by constructs from existing health behavior theories, such as the Health Belief Model (HBM). The HBM is a prominent model of health behavior positing that messages can impact behaviors by influencing psychological perceptions, including perceived risk, benefits, and barriers (Rosenstock, Strecher, & Becker, 1988). Decades after its development, the model continues to serve as a key theoretical approach for identifying psychological processes underlying health behavior change, such as HPV vaccination (Brewer & Fazekas, 2007). Combined, these models of key psychological mediators hold potential for explaining how and why narrative messages may persuade women's HPV vaccination intentions.

The present study examined key story features, mediating psychological processes, and vaccination intentions to better understand the components and mechanisms through which narratives can increase cervical cancer prevention. First, the study investigated the impact of death narratives (survival vs. death), barrier-focused narratives (social vs. structural), and their interaction on narrative processing (RQ1a-c), health belief variables (RQ2a-c) and vaccination intentions (RQ3a-c). Next, in line with the theoretical models outlined above, it explored 10 potential mediators via moderated mediation to explain the relationship between narrative messages and vaccination intentions (RQ4).

Method

Study Design

The present study used a 2 (survival vs. death) \times 2 (structural vs. social barriers) factorial design replicated across two story character variations (Rosie and Jennie) to test effects of the message features. Participants were randomly assigned to read one of eight narratives, and answer questions measuring demographic and

health history characteristics, narrative and health belief processes, and HPV vaccination intentions. The study was approved and monitored by the University of Utah institutional review board.

Participants

Women aged 18–26 were recruited through Amazon Mechanical Turk to participate in an online panel study ($N = 386$). Individuals received \$0.50 and entry into a \$100 lottery as compensation for their participation. A total of 348 participants completed the survey. Of these, 101 women had already initiated vaccination and were excluded from further analyses. Only women with no self-reported HPV vaccine doses were included in final analyses ($n = 247$). The mean age was 23.6 years old ($SD = 2.2$). Participants resided in 43 states and the District of Columbia. Three quarters of the participants were White, 8.9% Black, 7.7% Asian, 3.6% Hispanic/Latino, and 4.0% multiple or mixed race. The majority of women had attended or completed college. Most women (78.5%) had no children, 14.2% had one child, 7.3% had two or more. Eighty-two percent reported prior sexual activity, 14.2% ever had an abnormal Pap smear, and 6.9% reported past HPV infection (see supplementary Table 1 for additional characteristics).

Stimuli

Stories drawn from the target population are likely to contain naturally compelling elements (Larkey & Hecht, 2010). Therefore, narratives were adapted from real stories published on cervical cancer advocacy organization websites. The researchers manipulated two key aspects of selected stories (whether the character lived or died, and whether the character faced a social or structural barrier to vaccination) to generate a range of narrative conditions. In order to evaluate the generalizability across natural variations in details found in individual stories, we included two story replications (i.e., “Rosie’s story” and “Jennie’s story,” see supplementary material). In each narrative, a young woman experienced a cervical cancer diagnosis, underwent treatment, and opted to share her story with others. Because the original stories were shared by survivors, endings were modified to include the character’s death in half of the conditions. Toward the end of each story, the character acknowledged a barrier to the HPV vaccine and urged readers to get vaccinated to prevent cervical cancer. Following best practices suggested by previous research (Jensen et al., 2017) an additional foreshadowing sentence was also added to the beginning of each death narrative: “Not everyone who gets cervical cancer survives.” The remainder of each narrative was the same in both survival and death conditions. All narrative conditions were comparable in reading level (Flesch-Kincaid reading level: 8.1; reading ease: 66.9) and word count ($M = 762$; range: 735–800).

Measures

Sociodemographics. The survey included questions about age, sex, ethnicity/race, education level, household income, and prior sexual activity (whether the participant had ever had sexual intercourse).

Past health history variables. A series of single item measures asked participants if they had ever been vaccinated for the flu

or Hepatitis B; had an abnormal Pap test, HPV infection, or genital warts; or had been diagnosed with cervical, oral, or anal cancer.

Narrative transportation. Eleven general items from the Narrative Transportation Scale were scored on a 7-point scale anchored by endpoints *not at all* and *very much* (Green & Brock, 2000; $M = 4.83$, $SD = .86$, $\alpha = .737$).

Narrative believability. The Narrative Believability Scale (NBS-12) is a psychometrically robust measure comprising four subscales (Yale, 2013). Each subscale consists of 3 items measured from 1 to 7, anchored by endpoints *strongly disagree* and *strongly agree* (with the exception of two items that were anchored by *very low* and *very high*): coverage ($M = 5.30$, $SD = 1.16$, $\alpha = .652$), plausibility ($M = 5.95$, $SD = 1.03$, $\alpha = .818$), and consistency ($M = 5.66$, $SD = 1.13$, $\alpha = .848$).

Health Belief Model variables. Items to measure HBM constructs were adapted from Champion’s Health Belief Model Constructs Instrument and Revised Susceptibility, Benefits, and Barriers Scale to fit the context of HPV vaccination (Champion, 1984, 1999). Three items (5-point scale) measured perceived risk susceptibility to experiencing an HPV infection and developing cervical cancer (e.g., “It is likely that I will get an HPV infection in my lifetime” and “My chances of getting cervical cancer are great,” $M = 2.40$, $SD = .86$, $\alpha = .74$). Two items measured perceived risk severity to HPV and cervical cancer (“HPV is a serious health concern” and “Cervical cancer is a serious disease,” $M = 4.38$, $SD = .74$, $\alpha = .808$). Seven items measured benefits ($M = 3.44$, $SD = .86$, $\alpha = .891$), 11 measured barriers ($M = 2.21$, $SD = .67$, $\alpha = .86$), and 8 measured efficacy ($M = 3.78$, $SD = .83$, $\alpha = .925$).

HPV vaccination intentions. A systematic review of cervical cancer interventions found that the effect of most campaigns is sustained up to 3 months after initial message exposure (Shepherd, Peersman, Weston, & Napuli, 2000). Thus, response to the statement “I intend to begin the HPV vaccination series in the next 3 months” was measured on a 5-point scale anchored by *strongly agree* and *strongly disagree* ($M = 2.16$, $SD = 1.05$).

Analytic Approach

All analyses were conducted using SPSS version 20. An alpha level of .05 was the threshold for statistical significance across all tests, except where corrections for multiple comparisons are indicated. First, multivariate analysis of variance (MANOVA) determined whether message conditions were related to demographic and past health history variables that could serve as covariates in subsequent analyses. Given the number of comparisons generated by this analysis, a Bonferroni correction was included for all post hoc pairwise comparisons to address the concern of Type I error. Next, prior to model testing, MANCOVA assessed whether mediating processes and behavioral intention differed across message features or their interactions. In the last step, a moderated mediation model was conducted via PROCESS Model 8 (Hayes, 2012). Given prior research supporting survival/death as a key message feature, narrative outcome was designated as the independent variable, and narrative barrier was set as the moderator to generate interactions of these features. Thus, the model specified narrative outcome as the independent variable (X), narrative barrier as the moderator variable (W), and intention to vaccinate in the next 3 months as the dependent variable (Y). Ten process variables re-

flecting the dimensions of three theoretically derived pathways (transportation, believability, and health belief constructs) were entered as parallel mediators (M), and included covariates identified in the MANCOVA analysis. This model simultaneously tested whether any of the hypothesized processes mediated the pathway between narrative conditions and behavioral intention. All appropriate paths from the independent variable (X) to each possible mediator and from the interaction of X and W to each mediator were included in the model (see Figure 1). All indirect effects were subjected to follow-up bootstrap analyses with 1,000 bootstrap samples and 95% bias corrected confidence intervals.

Results

MANOVA results identified seven sociodemographic and health history variables for inclusion as covariates in subsequent analyses: education, household income, past flu vaccination, past Hepatitis B vaccination, history of abnormal Pap test, history of past HPV infection, and past sexual activity. In light of differences between the two character replications and their interactions with other narrative features, narrative character was also included in subsequent analyses as an additional covariate. Controlling for the differences between the Rosie and Jennie replications produced the following analyses, in which the natural variation across these individual cervical cancer narratives was separated from the impact of the manipulated story features.

Identifying Potential Mediators

RQ1-RQ3 asked whether the two narrative features or their interactions influenced psychological processes and vaccination intentions. Multivariate effects were observed for narrative outcome, Pillai's Trace = .129, $F(16, 216) = 2.004$, $p = .014$, consistent with the notion that whether characters in cervical cancer stories live or die matters. The multivariate test for narrative barrier was not significant, Pillai's Trace = .095, $F(16, 216) = 1.418$, $p = .135$. Tables 1 and 2 report the results for the two message feature manipulations by dependent variable. Survival narratives increased plausibility, consistency, coverage, self-efficacy, and reduced barriers, compared to death narratives. Bon-

ferroni post hoc tests indicated that each of these outcomes fared better when the character survived (see Table 1). Barrier condition was related to risk susceptibility ($p = .033$, see Table 2). Bonferroni post hoc tests revealed that structural barriers increased perceived risk susceptibility. The analysis also revealed one interaction of interest; narrative outcome \times barrier interaction was related to transportation ($p = .014$). Specifically, survival narratives featuring social barriers were associated with greater transportation into the story compared to other conditions.

Moderated Mediation

Next, RQ4 asked whether any theorized psychological narrative or health belief processes mediated the narrative message-behavioral intention relationship. Narrative outcome feature was related to transportation, $b = -.75$, $SE = .35$, $t = -2.13$, $p = .03$, and self-efficacy, $b = .66$, $SE = .29$, $t = 2.26$, $p = .02$. Narrative barrier was not related to any potential mediators. Consistent with MANCOVA findings, the interaction of narrative outcomes and barriers was related to transportation, $b = .52$, $SE = .22$, $t = 2.36$, $p = .02$ in the process model. In turn, the model assessed the relationship between mediators and behavioral intention. Intention to vaccinate in the next 3 months was positively predicted by transportation, $b = .17$, $SE = .09$, $t = 2.08$, $p = .04$, risk susceptibility, $b = .28$, $SE = .08$, $t = 3.46$, $p < .000$, and benefits, $b = .50$, $SE = .08$, $t = 5.90$, $p < .000$, and negatively predicted by risk severity, $b = -.23$, $SE = .09$, $t = -2.52$, $p = .012$.

Next, indirect effects of the interaction were examined to determine if mediation successfully carried through these potential pathways (see Figure 2). Two variables mediated the narrative outcome-behavioral intention relationship. The direct effect of the narrative outcome \times barrier interaction on vaccination intentions was mediated in part by transportation, $b = .1089$, bootstrapped $SE = .0661$, 95% CI [.0196, .2630] and by risk severity, $b = -.0835$, bootstrapped $SE = .0496$, 95% CI [-.2089, -.0105].

To understand these relationships, the interactions were probed at two levels of the moderator (social and structural barriers). An examination of this conditional indirect effect through transportation revealed that the survival narrative featuring a social barrier generated greater transportation, which in turn was positively associated with intentions to vaccinate in the next 3 months. Additionally, probing the second interaction effect revealed that survival narratives featuring social barriers increased perceived risk severity, which led to a reduction in intentions to vaccinate. Ultimately, when core constructs from three theorized models—the Transportation Imagery Model, the Story Model, and the Health Belief Model—were combined into a more comprehensive moderated mediation process model, two key variables (transportation and risk severity) emerged as parallel mechanisms driving the narrative-intention relationship (see Figure 2).

Discussion

Although narratives have demonstrated the ability to influence behaviors in numerous health contexts, not all stories translate into successful public health campaigns (Kreuter et al., 2007). As such, "pilot testing and formative research are essential steps" to better understand combinations of features that result in effective health narratives, and the processes that explain how these messages

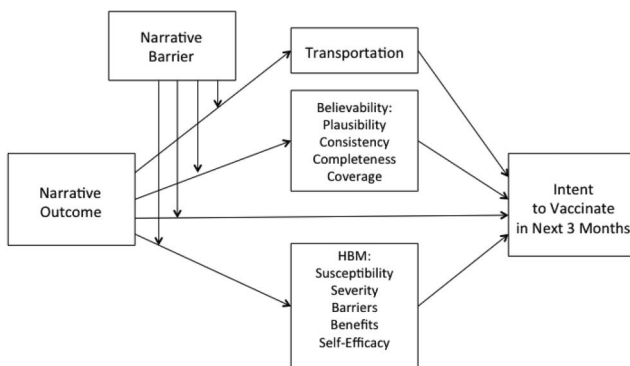


Figure 1. Hypothesized model of narrative persuasion. Moderated mediation model with narrative outcome as the independent variable, narrative barriers as the moderator, and 10 narrative and health belief variables as parallel mediators.

Table 1
One-Way ANOVAs With Narrative and Health Communication Constructs as Dependent Variables and Narrative Outcome as the Independent Variable

Dependent variables	Levene's <i>F</i>	ANOVA <i>F</i>	Survival <i>M (SD)</i>	Death <i>M (SD)</i>
Transportation	1.04	.09	4.84 (.88) ^a	4.81 (.85) ^a
NBS—Plausibility	1.35	6.24*	6.11 (.95) ^a	5.80 (1.08) ^b
NBS—Completeness	1.61	1.38	6.04 (.97) ^a	5.89 (1.02) ^a
NBS—Consistency	3.08**	5.21*	5.83 (1.06) ^a	5.49 (1.19) ^b
NBS—Coverage	.65	6.18*	5.49 (1.12) ^a	5.11 (1.18) ^b
Self-Efficacy	1.23	9.28**	4.12 (.79) ^a	3.89 (.73) ^b
HBM Benefits	1.83 [†]	.73	3.42 (.91) ^a	3.48 (.79) ^a
HBM Barriers	.42	8.27**	2.11 (.67) ^a	2.31 (.65) ^b
HBM Risk Susceptibility	1.67	.004	2.39 (.89) ^a	2.42 (.82) ^a
HBM Risk Severity	2.01 [†]	.62	4.43 (.72) ^a	4.32 (.76) ^a
Intent to Vaccinate 3 mo.	2.03 [†]	.15	2.19 (1.14) ^a	2.14 (.97) ^a

Note. *N* = 247. Means that do not share superscripts are significantly different, *p* < .05. Superscripts should be read horizontally, not vertically. NBS = Narrative Believability Scale; HBM = Health Belief Model.

[†] *p* < .10. * *p* < .05. ** *p* < .01.

move audiences to action (Green, 2008). Following this prompt, the current study examined two key features of cervical cancer narratives (survival/death outcomes and social/structural barriers), and tested theorized pathways through which narratives indirectly influenced HPV vaccination intentions. Thus, the current study offers a successful example for evaluating potential health campaigns through systematic message testing.

Findings from this study first contribute to the narrative persuasion literature by examining two key features as part of a growing effort to build out a typology of narrative message elements (e.g., Kreuter et al., 2007; Shaffer & Zikmund-Fisher, 2013). Of the eight cervical cancer narrative conditions tested, survival stories addressing a social barrier demonstrated the greatest potential to increase women's intentions to vaccinate for HPV in the next 3 months by increasing narrative transportation, or the degree to which readers were "absorbed into" the story. This story fared

better than those featuring structural barriers and/or death narratives.

In particular, results support story outcome as a critical narrative feature that impacts the degree to which readers become involved in cervical cancer stories. This is consistent with the hypothesis that outcome-based narratives, which focus on the health outcomes associated with a behavior or decision, are likely to be most effective when the primary purpose is to persuade (Shaffer & Zikmund-Fisher, 2013). This finding is important because outcomes across existing narrative health campaigns often vary in terms of whether individuals featured in the messages live or die. For example, the CDC's "Tips from Former Smokers" campaign features a series of brief narratives from survivors of smoking-related health conditions, while other campaigns have featured loss of a loved one. In contrast to a preference for death narratives about melanoma prevention among older adults (Jensen et al., 2017), the present results suggest that cervical cancer narratives targeted to young women appear to work best in a fundamentally different combination of features, emphasizing survival of a young female character.

There are several possible explanations for why young women differed in processing survival and death cervical cancer narratives. In this study, characters across all story conditions followed the same pattern of health behavior (i.e., did not receive the HPV vaccine). Thus, the ability of survival narratives to transport readers more than death narratives was not attributable to the character's behavior, but rather to a more implicit aspect of the story ending. One explanation is that survival versus death functioned as a manipulation of outcome *severity* for the same pattern of health behavior. Given the relatively young age range of the study sample, death may also simply be less salient for this population, something future studies can directly test. Another possibility is that inclusion of a brief statement foreshadowing the possibility of tragedy in the death narratives served to heighten *uncertainty* among readers, which attenuated narrative engagement. Future studies can examine these hypotheses by directly assessing perceptions of uncertainty of narrative outcomes. Overall, the present study supports the conclusion that story outcomes can impact

Table 2
One-Way ANOVAs With Narrative and Health Communication Constructs as Dependent Variables and Narrative Barrier as the Independent Variable

Construct	ANOVA <i>F</i>	Structural Barrier <i>M (SD)</i>	Social Barrier <i>M (SD)</i>
Transportation	.40	4.79 (.89) ^a	4.87 (.83) ^a
NBS—Plausibility	.02	5.92 (.98) ^a	5.98 (1.09) ^a
NBS—Completeness	.32	5.92 (1.01) ^a	6.01 (.98) ^a
NBS—Consistency	1.74	5.55 (1.20) ^a	5.78 (1.06) ^a
NBS—Coverage	.07	5.29 (1.16) ^a	5.30 (1.17) ^a
Self-Efficacy	.52	4.01 (.73) ^a	4.00 (.81) ^a
HBM Benefits	.25	3.45 (.88) ^a	3.45 (.82) ^a
HBM Barriers	.00	2.22 (.69) ^a	2.20 (.64) ^a
HBM Risk Susceptibility	4.61*	2.52 (.86) ^a	2.28 (.83) ^b
HBM Risk Severity	.32	4.33 (.76) ^a	4.42 (.72) ^a
Intent to Vaccinate 3 mo.	.19	2.18 (1.05) ^a	2.15 (1.06) ^a

Note. *N* = 247. Means that do not share superscripts are significantly different, *p* < .05. Superscripts should be read horizontally, not vertically. NBS = Narrative Believability Scale; HBM = Health Belief Model.

* *p* < .05.

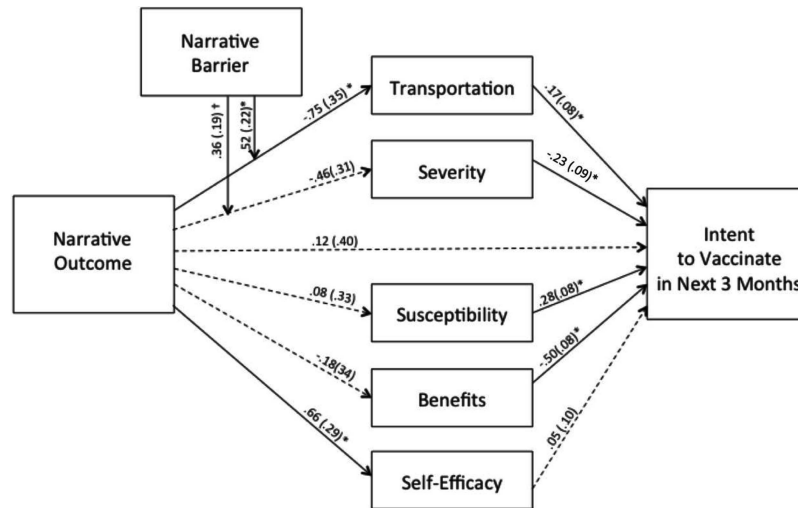


Figure 2. Moderated Mediation. $N = 247$. Moderated mediation model (PROCESS Model 8) with narrative outcome as the independent variable, narrative barriers as the moderator, and 10 narrative and health belief variables as parallel mediators. Only mediators with one or more significant paths are depicted. Dotted lines indicate nonsignificant paths. $^\dagger p < .10$. $^* p < .05$.

audience transportation into a message, and that which outcome is most persuasive may be audience- and context-specific.

Examined as individual message features, outcomes significantly influenced numerous processes, while narrative barriers had less impact across the board. This finding is interesting in that a great deal of research attention has been focused on barriers to HPV vaccination (Holman et al., 2014). Yet results suggest barriers may be only one component of more complex narrative structures. Stories, by definition, contain an integrated structure comprising multiple narrative features, including characters, experiences, and outcomes, and should therefore be assessed as multi-dimensional structures (Kreuter et al., 2007; Shaffer & Zikmund-Fisher, 2013). Factorial design allowed for analyses of how features work together to impact reader engagement and, ultimately, health behavior. Thus, the present study found that barriers might be more effectively conceptualized as a moderating feature within survival narratives. In sum, the results for both narrative features, as well as the interaction between them, contribute to growing efforts to better understand the types of narratives that comprise effective health communication messages.

Previous work on story-based HPV vaccination campaigns has noted the need for more research on the narrative mechanisms of persuasion (Hopfer, 2012). Thus, the present study examined these processes as potential narrative mediators of the message-behavior relationship in narrative health campaigns. The study also considered additional possible mechanisms drawn from the behavioral health literature to determine if they could offer additional explanation of how narrative messages translate into health intentions.

Interestingly, only two theorized process variables, transportation and risk severity, mediated the relationship between narratives and vaccination intentions. Of these, transportation accounted for the survivor/social barrier effect on intention, and demonstrated the greater mediating effect. The observation that transportation acts as a robust mediator is consistent with the body of research on

transportation imagery theory and cancer control (e.g., Green, 2008). From a mechanism standpoint, transportation seems to be a strong driver of how narrative persuasion operates. Yet transportation alone is not sufficient to account for the complex processing that results in behavior change, as not all readers who are transported will be moved to action. Consistent with this idea, the present study found a smaller effect across the transportation to intention path than the initial jump from narratives to transportation. While transportation accounts for whether a reader is drawn into a story, more research is needed to determine how transportation translates into persuasive outcomes, such as attitudes, intentions, and behaviors.

Although survival/social barrier narratives also increased perceived severity, the negative association between perceived severity and intention to vaccinate was surprising. One possible explanation for this relationship is that narratives about cervical cancer may function as fear appeals among individuals who perceive HPV and cervical cancer with greater severity, and trigger avoidance (lower intent to vaccinate) as a fear control response (Witte, 1992). Future studies should incorporate more explicit measures of fear appeals based on the work of Carcioppolo and colleagues, to test this hypothesis empirically in the context of HPV vaccination (Carcioppolo et al., 2013).

Results also suggest there may be other compelling components of narrative persuasion yet to be identified, such as affective responses, and should be examined by future research. For example, Oliver and Raney (2011) argue that narrative processing may occur as messages are affectively experienced as hedonic (enjoyable) or eudaimonic (meaningful). As health narratives are often not inherently pleasure-inducing, they may instead persuade by providing audiences with a meaningful experience. Future studies should consider the role of these affective motivations in audience engagement with health narratives.

The present study contains several limitations. Although the study offers productive directions for investigating cervical cancer narra-

tives, results may not generalize to other cancer communication contexts. Second, the study design included two out of many potential barriers to HPV vaccination, and thus results cannot be generalized beyond the specific barriers included in these narratives. Future studies should examine the impact of other possible combinations of story features, including barriers such as cost, health care access, and lack of vaccine knowledge. Additionally, the study focused on written messages. Still unknown is how presentation of the same content through other narrative formats, such as videos, may influence outcomes for this audience (Green, 2008). Given the technological access of this generation, media-rich narrative formats may be even more effective with young women. For example, video narratives may stimulate vivid imagery, an important component of narrative transportation (Green & Brock, 2000). Finally, the study design was cross-sectional. Administered at one point in time, data collected through this survey does not track the impact of message effects over time, and therefore, causal claims should be interpreted with caution. Relatedly, the study measured intention as the outcome variable, rather than behavior. This is a common limitation of experimental survey work and can be addressed by future research engaging longitudinal designs to track actual vaccination behavior. Incorporating both intentions and behaviors as outcome measures may shed more light on how and why narratives influence young women to engage in cancer prevention behaviors.

Results also offer several clear contributions to the study and practice of narrative persuasion in health communication. First, researchers should continue working toward a more comprehensive typology of message features, following the basic categories proposed by Kreuter and colleagues (2007; e.g., plot and character development, suspense, and emotional range). These qualities must be considered individually and also in conjunction to create persuasive narratives. The present study contributes to this typology by exploring two such components, outcomes and barriers. At the same time, scholars are also examining other message features, including character stigma (Chung & Slater, 2013) and narrator perspective (Nan, Dahlstrom, Richards, & Rangarajan, 2015), and should continue to expand this typology. The study also demonstrates how narrative processes such as transportation can be employed as diagnostic tools for narrative-based public health campaigns. Hence, these findings offer tangible strategies for crafting more effective messages, and ultimately increasing cervical cancer prevention.

Finally, results draw attention to a fundamental principle of narrative health campaigns. That is, the effectiveness of distinctive narrative structures may be audience-specific, health issue-specific, or behavior-specific. Narrative persuasion research is in its infancy, and the current study illuminates important questions that public health communication researchers should continue to pursue. This work makes strides toward a more complex understanding of how narrative messages operate in the context of cervical cancer prevention, and moves toward a more comprehensive theoretical understanding of narrative persuasion.

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